

Koop Foundation, Inc.

Sharing Information and Controlling Costs in the Healthcare Industry

In the early 1990s, the United States attempted to institute a universal healthcare system, an initiative that drew attention to the need to control costs, reduce duplicative testing, and provide high-quality patient care throughout a patient's lifetime. As physician practice models began to evolve to meet the nation's challenge, the need to migrate to a better information infrastructure that encouraged information sharing and cost control became apparent. A joint venture of companies and nonprofit institutions, led by the Koop Foundation, Inc., attempted to develop the best information and process management models to share healthcare information and control costs. By building a set of healthcare domain analysis tools, the joint venture hoped to design information systems for industry-wide use that would overcome the existing problems of fragmented information and lack of cost awareness.

The Koop Foundation joint venture proposed the \$30 million project to the Advanced Technology Program's (ATP) Information Infrastructure for Healthcare focused program. They received an award of cost-shared funds in 1995 to pursue research in metamodel development and an open and extensible system architecture that independent vendors could then use to develop a wide range of modern information tools for the healthcare industry. By the time the project ended in 1998, the joint venture had met all of its technical objectives, had developed an open-source Web-based collaborative toolkit for business process reengineering, had launched a healthcare reengineering Center of Excellence to support adoption of the technology throughout the industry, and had presented project knowledge at numerous conferences. However, when the healthcare industry moved away from universal integration in the late 1990s, the reengineering tools developed by the joint venture no longer had a role in the marketplace.

COMPOSITE PERFORMANCE SCORE

(based on a four star rating)

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Research and data for Status Report 94-04-0037 were collected during April 2002 - June 2002 and March 2003.

Existing Practices Limit Efficiency of the U.S. Healthcare Industry

Until 1994, information technology (IT) systems evolved to support the provider-driven, fee-for-service healthcare industry. As medical practices began to consolidate across municipality and state boundaries, and as business model changes ushered in an era of integration to provide a birth-to-death continuum of care, healthcare professionals found it extremely difficult to manage patient data and to eliminate duplicative costs. Information systems could not communicate with one another, medical records could not be accessed quickly, and dynamic best practice

care paths were not available to providers across individual information systems, much less across the industry as a whole. This technological hindrance slowed migration to a fully integrated delivery system.

Joint Venture Proposes Health Informatics Initiative

The Koop Foundation joint venture formed to analyze the healthcare industry, to develop necessary information models to support reengineering, and to enable communication across software programs and hardware. Conceptually, the project envisioned the reengineering tools as the base of the healthcare information pyramid. The tools would provide the

infrastructure for enterprise integration, data banks/knowledge repositories, process reengineering strategies, and integration services for a national infrastructure. This foundation would then enable a Web-based middleware that would facilitate communications and incorporate point-of-care medical records, cost-control software, security and confidentiality systems, and critical care paths. Patients, physicians, and other care providers would interact at the top level. This interface would relate the middleware with the foundational elements to provide health education, prevention, cost management, telemedicine, and digital medical records across the entire information system. To create the foundational tools for healthcare industry reengineering, the joint venture proposed the following three-stage schedule:

Stage One: Lay out the requirements for an enhanced enterprise engineering life cycle methodology to ensure that reengineering tools are useful and manageable. This stage would be completed when the entire business process reengineering (BPR) toolset was generated.

Stage Two: Integrate the BPR toolset into a scalable, supportable, real-time software system capable of operating on any hardware platform.

Stage Three: Test, adjust, and achieve final demonstration of the process reengineering system.

Koop Foundation Assembles Top Industry Talent

In order to succeed, the joint venture needed participants with expertise in three diverse environments: healthcare, BPR, and information systems engineering. While overall project management was Koop Foundation's responsibility, the following health care organizations and IT companies participated in the joint venture:

Beth Israel Deaconess Medical Center. Located in Boston, Massachusetts, this medical center is a Harvard University teaching and research hospital and has its own system of community outpatient facilities throughout Massachusetts. As a large academic medical center, Beth Israel Deaconess assisted the joint venture by developing processes and systems that could be incorporated into physician practice, remote facility management, and critical care management.

Booz Allen Hamilton. Located in Arlington, Virginia, Booz Allen Hamilton is a large international consulting firm experienced in assisting commercial and public sector clients with information system integration. The firm participated in the venture to ensure software component compatibility and to provide insight into the types of systems that private medical centers and not-for-profit hospitals would need in the coming years.

D. Appleton Company, Inc. Located in Reston, Virginia, D. Appleton Company, Inc., is a consulting firm specializing in developing information engineering models and system architecture for public sector clients. The company maintained the joint venture's focus on the national healthcare infrastructure and the systems needed to administer healthcare across the United States.

GTE Government Systems. Located in Chantilly, Virginia, GTE maintains a staff of programmers who handle systems integration for a variety of highly sensitive networks, such as those for the Department of Defense. GTE provided systems integration experience, as well as a focus on information security.

International Cancer Alliance. Located in Bethesda, Maryland, the International Cancer Alliance is a nonprofit organization that provides high-quality, focused, user-friendly cancer information to patients and their physicians on an ongoing and person-to-person basis. The Alliance participated to provide a voice for patient education software and online health information as part of the systems reengineering process.

Meta Software Corporation. Located in Cambridge, Massachusetts, Meta Software Corporation provided modeling and simulation solutions to assist the BPR.

Oracle Corporation. Located in Bethesda, Maryland, Oracle Corporation produces large database products for commercial use. Oracle participated to ensure that the database backbone was strong enough to handle all information about patients, procedures, care paths, and billing processes across the healthcare system.

Wizdom Systems, Inc. Located in Alexandria, Virginia, Wizdom Systems provides training services for BPR,

change management, and activity-based costing to achieve employee and executive "buy-in." Wizdom Systems worked to make sure that the joint venture's final product was manageable, teachable, and useable within the healthcare industry.

Other firms participated in the joint venture, but became inactive or withdrew across its lifetime. These firms included AT&T, Corporation for Studies and Analysis, Logicon, Systems Research and Applications Corporation, Science Applications International Corporation, and the Western Consortium for Public Health.

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This diverse joint venture was formed in response to the ATP focused program "Information Infrastructure for Healthcare." ATP requested research plans in this area because wide-ranging partnerships were needed to advance the state-of-the-art; there were significant technical issues associated with the development of medicine-related tools; and the results would be broad, bringing new technologies with significant economic benefit to the U.S.-based healthcare market. As of 1994, medical spending for the entire United States exceeded \$938 billion; however, 20 percent of those costs were related to the processing of information. By funding projects that would reduce the astronomical IT costs within the healthcare system, ATP hoped to reduce healthcare costs overall.

New Information System Promises Tremendous Cost Savings

Healthcare providers using the fee-for-service model in 1994 had little incentive to change to an information system that would maximize communication, minimize duplicative testing, and increase the efficiency of costly medical care. Industry trends, however, suggested that a new type of information system would be needed in coming years. Payers, such as the Federal Government's Health Care Financing Administration (the agency that administers the Medicare program,

now known as the Center for Medicare and Medicaid Services) and private insurers, were just beginning to scale back reimbursement for medical services to limit redundant care. In an attempt to negotiate more favorable reimbursement terms from payers, the healthcare industry was beginning to consolidate, to control costs by eliminating excess staff and services, and to provide comprehensive services through health maintenance organizations. If successful, the Koop Foundation project could provide the base knowledge and tools to adapt information systems to fit the emerging paradigm, enabling tremendous cost savings to providers, payers, employers, and the U.S. Government. Given this potential for significant social benefits, the Koop Foundation submitted a proposal to ATP.

Potential for Infratechnology Yields ATP Research Funds

The Koop Foundation joint venture's proposal was designed to create an IT process that could be shared across the entire healthcare industry as business processes and information systems were reengineered around emerging IT capabilities. Facilitating this process, the Koop Foundation proposed to build open-source software systems and to distribute information on BPR via the Internet. By using open distribution, even if the project failed, substantial knowledge spillover would occur throughout the healthcare industry. If commercially successful, the spillover effects could be significantly greater.

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For example, there would be a direct benefit of cost reductions of 50 to 75 percent resulting from both a reduction in administration costs and the elimination of redundant tests. Moreover, spillover benefits would accrue to the healthcare industry as a whole in the form of additional time available to providers to care for other patients, improved patient care from these providers, and increased profitability for providers and insurers. Concomitant with better medical care would be decreased sick days and increased productivity

throughout the U.S. workforce. Benefits for the Federal Government would also be significant, to include cost savings to the Medicare and Medicaid programs.

Given the fit with the healthcare industry's information infrastructure needs, and the potential for broad-based economic benefits across the U.S. economy, ATP awarded the Koop Foundation joint venture \$14.4 million in cost-shared funds to conduct research and to establish a demonstration project of a new healthcare informatics BPR information system.

Joint Venture Defines Goals for the Initiative

Three major technology challenges had previously limited the healthcare industry:

- Lack of interoperability across the healthcare system
- Lack of tools to identify appropriate IT elements to meet high-level business needs
- Lack of software to enable communication among the diverse software and IT systems used in the healthcare market

The joint venture identified four main "thrust areas" for its research and development activities: domain, methodology, metamodel/knowledge base, and pilot application. Not surprisingly, the first three thrust areas aligned with the three major technology challenges. Each thrust would develop knowledge within the healthcare industry that would spill over to other market players even if the entire project failed. If successful, the BPR software package could become the infratechnology described above.

The domain thrust would involve constructing tools to analyze the healthcare industry, to identify needs across the healthcare domain, and to analyze existing systems. The methodology thrust would entail identifying business goals of players within the healthcare system and selecting appropriate IT elements that could address those goals. The metamodel/knowledge base thrust would consider the potential for interoperability of the previously identified IT elements. Finally, the pilot application thrust would

bring all of the areas together into a working model for healthcare BPR using open and extensible system architecture tools.

Upon completion of the research project, participating institutions hoped to use the BPR toolkit to restructure their own IT departments. Participants would then work to convince other healthcare market participants to use the toolkit, visit the Center of Excellence for hands-on lessons in BPR, and acquire information from a variety of web sites regarding this project.

Koop Foundation Overcomes Technical Obstacles

The Koop Foundation had to overcome three technical objectives in order to develop and demonstrate a BPR IT application. First, the fragmented nature of the healthcare system and the lack of system interoperability had hindered previous attempts to understand the full healthcare domain. This required a top-to-bottom analysis of available healthcare information systems, their prevalence, and their use. To obtain this kind of analysis and understanding, a diverse group of joint venture participants would need to use all available resources to understand and map the healthcare domain. After intensive effort early in the project, this was accomplished.

Second, the project required that joint venture participants establish a set of comprehensive methodological processes that could reliably and predictably transform high-level business objectives into executable specifications for information infrastructure services. In order to accomplish this, an extraordinarily complex program was needed that could understand the existing systems, could be tailored by administrators to make it compatible with current systems as well as be adaptable and compatible with future systems, and could recommend a menu of IT applications that could enable the strategic plans in the most effective manner. The joint venture developed a tool to accomplish this task.

Third, the joint venture needed to address the industry's lack of software that could enable communication among programs and across systems. This task was particularly difficult because the BPR toolset could potentially recommend a different set of information systems for each user. Joint venture participants

needed to develop additional software that could facilitate the communication between software packages, as well as allow each software package to run on any IT system that the healthcare market participant used. This was the most challenging of the technical tasks and required a tremendous amount of time, energy, programming, and expertise from each joint venture participant. Before the end of the ATP-funded project, a team from Booz Allen Hamilton and Oracle held a successful demonstration where they achieved communication of basic data between the same types of basic software applications used by Beth Israel Deaconess Medical Center. Substantial additional work would be needed to make the demonstration commercially viable.

The healthcare industry's goals had undergone a drastic change by the time the ATP-funded project ended.

Upon completion of the ATP-funded research and development project in 1998, the Koop Foundation joint venture had met all of its technical goals and had conducted a successful demonstration of its model for healthcare BPR.

The joint venture had also developed several BPR web sites that gave the public access to much of the knowledge developed as part of this ATP-funded effort. Joint venture participants employed up to 12 new full-time employees for the ATP-funded project, many of whom continued employment into 1999 and beyond. Moreover, the joint venture constructed a Business Process Reengineering Center of Excellence where they provided access to their tools in order to assist healthcare market participants in their reengineering efforts. Staff members from several of the joint venture participants, such as Wizdom Systems, GTE Government Systems, and Beth Israel Deaconess Medical Center, delivered 16 presentations on the IT system at various conferences and symposia.

Outside the joint venture, Wizdom Systems successfully expanded its healthcare BPR software for customization and use in industries other than healthcare, and the company commercialized six BPR products.

Full Commercialization Never Realized

The information generated by the joint venture was available to healthcare market participants, but the healthcare industry's goals had undergone a drastic change by the time the ATP-funded project ended in late 1998. Universal integration was no longer an industry focus, so this type of healthcare informatics initiative was no longer necessary. Although consolidation and cost control efforts increased dramatically between 1994 and 1997, by early 1998 the trend had slowed markedly. By that time, the attempt to forge a universal healthcare system had failed, the idea had faded from national discourse, and the largest and most aggressive healthcare industry consolidators were under investigation for overcharging Medicare and Medicaid to cover cost overruns.

Conclusion

Shortly after the end of the ATP-funded project, several joint venture participants arranged to use the business process reengineering (BPR) software in their own internal systems and on some external engagements. Wizdom Systems developed six new products for BPR based on the ATP-funded technology. After the conclusion of the ATP project, Wizdom worked to improve and commercialize their BPR tools across industries, which they continue to sell. These were the only tools that achieved commercial success after the ATP-funded research project ended. By late 1998, industry changes had advanced the healthcare marketplace beyond the Koop Foundation's ability to provide a useful BPR service. Moreover, the Koop Foundation had gone bankrupt by late 2001 for reasons unrelated to this ATP-funded project, and all web sites with the BPR information had been taken off-line.

PROJECT HIGHLIGHTS

Koop Foundation, Inc.

Project Title: Sharing Information and Controlling Costs in the Healthcare Industry (Healthcare Informatics Initiative)

Project: To analyze the healthcare industry from the viewpoint of modern information management and to develop the necessary information models and tools to support the task of reengineering the industry to take best advantage of the developing national information infrastructure.

Duration: 3/1/1995-8/28/1998

ATP Number: 94-04-0037

Funding (in thousands):

ATP Final Cost	\$14,379	47%
Participant Final Cost	<u>16,490</u>	53%
Total	\$ 30,869	

Accomplishments: This project successfully developed and demonstrated a business process reengineering (BPR) information technology (IT) application for use by the healthcare industry. The system used an open and extensible architecture in an effort to speed up industry adoption of new IT applications that could achieve business goals. The Koop Foundation joint venture accomplished the following:

- The joint venture conducted a complete healthcare marketplace domain analysis in order to understand why certain systems were used, how they interacted, and what were the benefits and drawbacks of each system.
- The joint venture developed logic that enabled healthcare executives to enter in their strategic business plans and receive a menu of IT applications to achieve their goals.
- The joint venture enabled system and program interoperability for IT solutions for the healthcare industry. These programs could run on any system and could share information regardless of origin or physical location.

- Knowledge spillover occurred in the form of web publication, traditional papers, and presentations, including presentations at numerous conferences.

Outside the joint venture, Wizdom Systems worked to improve its BPR software after the close of the ATP-funded project and eventually commercialized six BPR tools for use across industries. Many are still on the market, after numerous updates.

Commercialization Status: Changes in the healthcare marketplace prevented the Koop Foundation joint venture from commercializing the ATP-funded technology. Aggressive cost cutting had not proven successful for the healthcare providers, and a universal approach to healthcare delivery had faded from the national scene. BPR that was designed to incorporate systems that enable integration and aggressive cost control, therefore, no longer had a role in the marketplace. Due to these changes, the Koop Foundation's BPR tool no longer had a market. Outside the joint venture, however, Wizdom Systems developed six new products for BPR, based in part on the ATP-funded project, that could be used in any industry, not just healthcare. Those products are still on the market.

Outlook: Given the market change, the lasting impact of this project will be the potential for knowledge spillover to other industries that may one day undertake similar BPR projects.

Composite Performance Score: *

Focused Program: Information Infrastructure for Healthcare, 1995

Company:

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(The KOOP Foundation, Inc., has ceased operation. This is not related to the ATP-funded joint venture. Other participants in the joint venture would be able to revive the research if they chose to do so.)